



Instream Flow Pilot Program Update

For the SB330 Study Committee

October 5, 2005

By New Hampshire DES

LOA (List of Acronyms)

- **PISF** – Protected Instream Flow
- **WMPA** – Water Management Planning Area
(watershed of the Designated River)
- **WMPAAC** and **TRC** – Stakeholder and
Technical committees

LOA (List of Acronyms)

- **AWUs** – water users required to be registered and having a withdrawal or return location within 500 feet of a designated river or tributary
- **ADOs** – dam owners with an impoundment with a surface area greater than 10 acres
- **IPUOCRs** – Protected entities listed in RSA 483 and Designated Uses under the Clean Water Act (derived from Instream Protected Uses, Outstanding Characteristics, Resources)

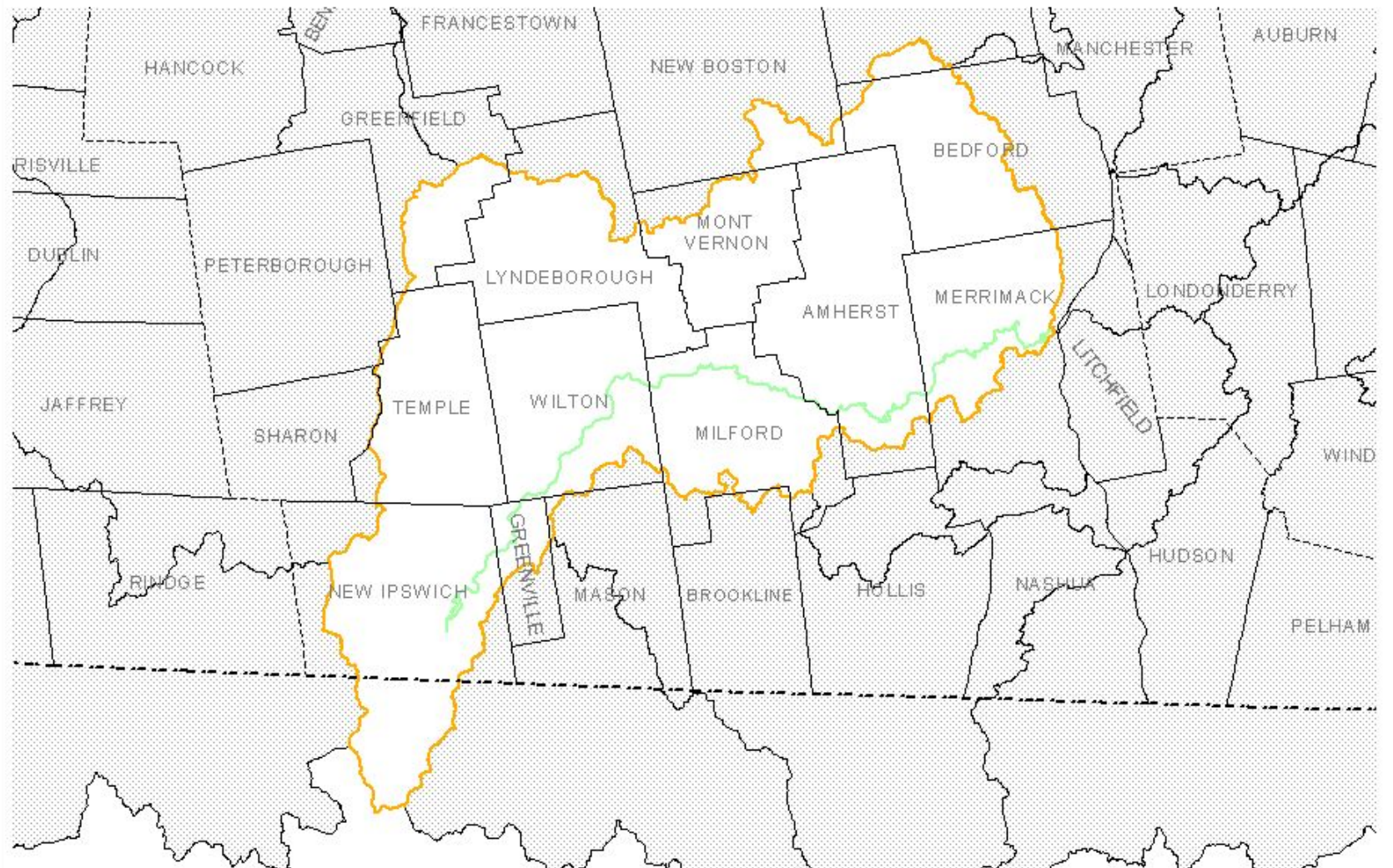
Souhegan-specific information



Souhegan River WMPA

- Covers 220 miles² and extends into MA
- 34 miles of Designated Reach
- Rural, rural-community, and community segments; no natural segments
- Three stream gages – 1 remaining active
- 23 affected dams
- 18 affected water user facilities with 34 sources or discharges

Souhegan River Watershed Management Planning Area



Legend

Souhegan Designated Reach

Political Boundaries

State boundary

County boundary

Town boundary



4 0 4 8 Miles



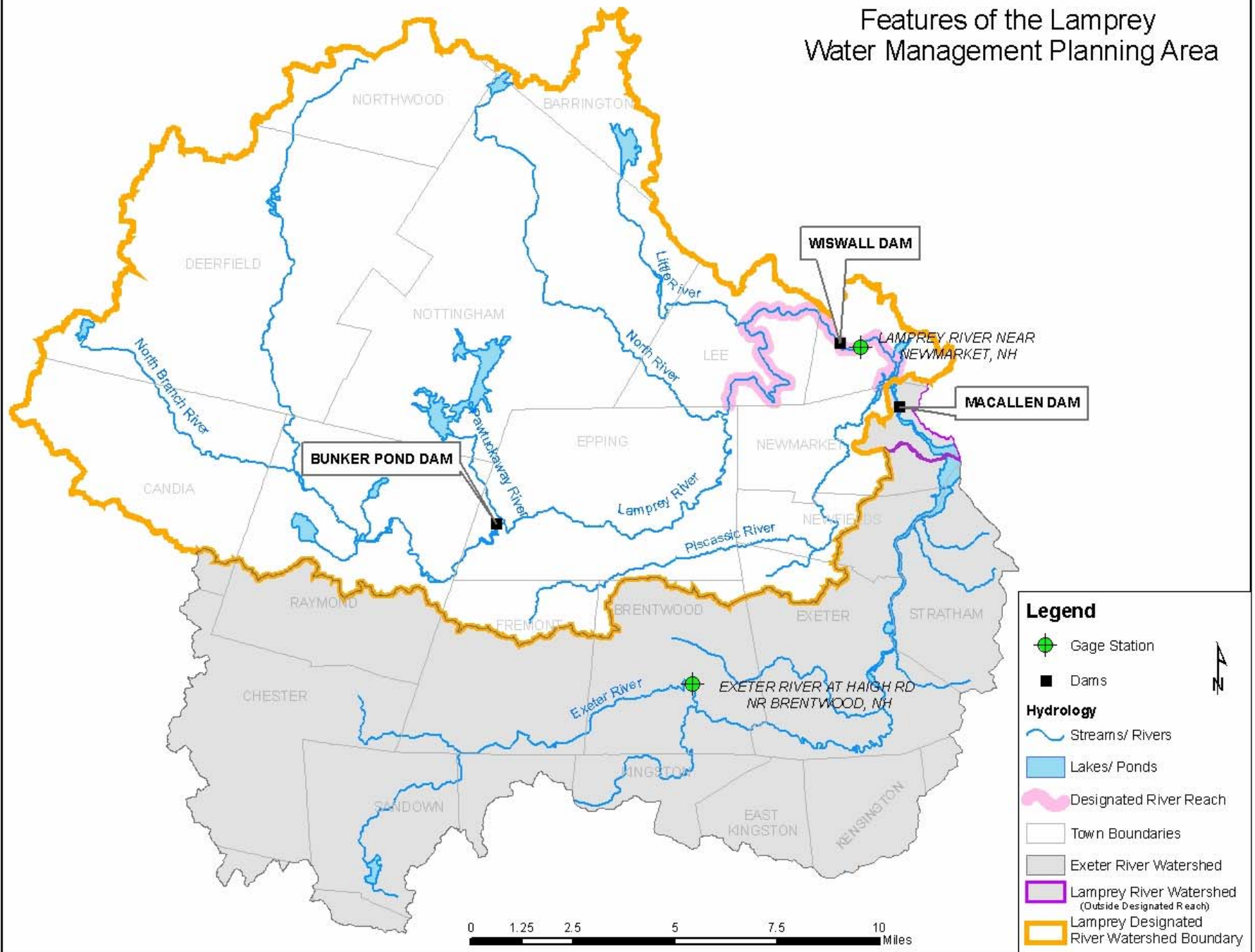
Lamprey-specific information



Lamprey River WMPA

- Covers 212 miles² (173 upstream of DR)
- 12 miles of Designated Reach
- DR classified as Rural under RMPP
- One active stream gage (near Packers Falls)
- 22 affected dams (Wiswall only one in DR)
- Eight affected water user facilities with 17 sources or discharges

Features of the Lamprey Water Management Planning Area



Objectives of the Protected Instream Flow Study

- Identify IPUOCR entities
- Assess IPUOCR flow needs
- Document results of PISF assessment

Objectives of the Water Management Plan

- Assess management needs
- Create three sub-plans with a range of alternatives with costs
 - Water conservation plan (demand management)
 - Dam management plan (supply management)
 - Water use plan (operational management)
- Select actions for each ADO and AWU to meet PISF and create implementation schedule

ISFR Pilot Program Consultant Tasks

- Task 1. Draft List of Protected Entities
- Task 2. Assessment of Well Withdrawal Impacts on Surface Water
- Task 3. On-Stream Survey for Protected Entities
- Task 4. Report Describing Protected Entities and Proposed PISF Methods
- Task 5. PISF Assessments and Proposed PISF Report
- Task 6. PISF Public Hearing (JOINTLY with the legislature)
- Task 7. PISF Report for the Lamprey River
- Task 8. Assessment of Water Use with the Established PISF
- Task 9. Development of WMP Sub-Plans
- Task 10. Proposed WMP
- Task 11. WMP Public Hearing (JOINTLY with the legislature)
- Task 12. WMP for Lamprey River

At the last presentation

October 27, 2004

- Souhegan had begun – Tasks 1, 3 and 4 completed and Task 2 progressing
 - Task 1 - Draft IPUOCR list
 - Task 2 - Surface Water and Groundwater Interactions Study
 - Task 3 - On-stream survey of IPUOCR entities
 - Task 4 - Report on Final IPUOCR list and Proposed Assessment Methods
- Lamprey was in the early stages of contracting and committee development

Lamprey since last presentation

- February 25 – G&C approves NOAA funding ISF Committees established and meeting
- July 13 - G&C approves contract with NAI
- Task 1 - Draft IPUOCR list
- Task 3 - On-stream survey of IPUOCR entities
- IPUOCR review meeting with WMPAAC scheduled for October 7

Souhegan since last presentation

- Task 2 - Surface Water and Groundwater Interactions Study completed
- Task 5 - PISF Assessments and Proposed PISF Report – in progress
 - TFC component of model near completion
 - TFC defines the goals of flow protection

Key Components of both Pilots

- Target Fish Community (TFC)
- MesoHABSim with flyovers in Lamprey
- Multi-Criteria Decision Analysis (MCDA)

What is a TFC?

- a methodology to describe the characteristics of a healthy, stable, river fish community based on reference rivers
- describes a measurable assessment target

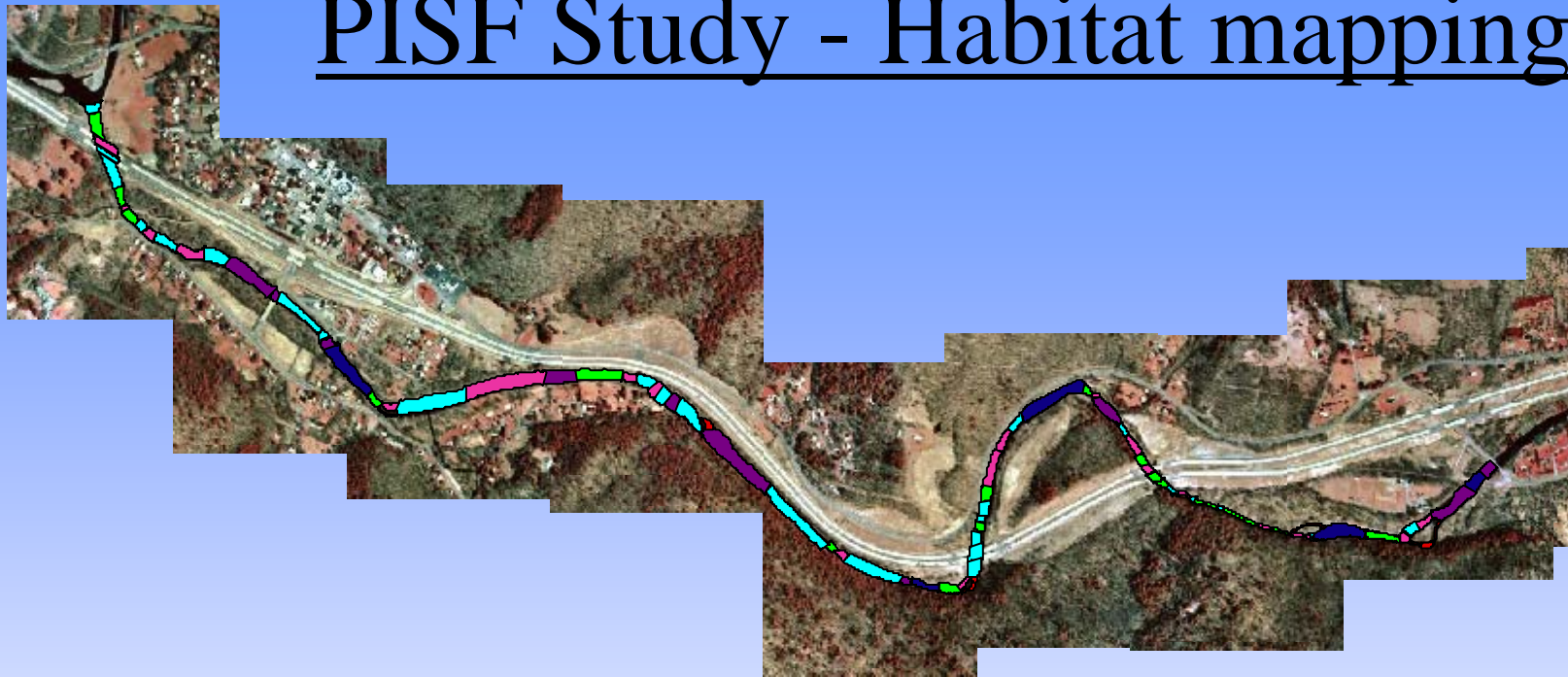
TFC

- Rivers should have river fish communities
- Assumption: Biological integrity should be maintained and is defined by “a balanced, integrated, adaptive community” (Karr, 1991)
- Goal: “Define the fish community that is appropriate for a natural river in southern New England” (Bain and Meixler, 2000)

MesoHABSIM

- Habitat simulation model for fish species
- Generates changes in habitat availability with change in flow
- Uses fish from the TFC as inputs
- Choose flows that best approximate the TFC

PISF Study - Habitat mapping

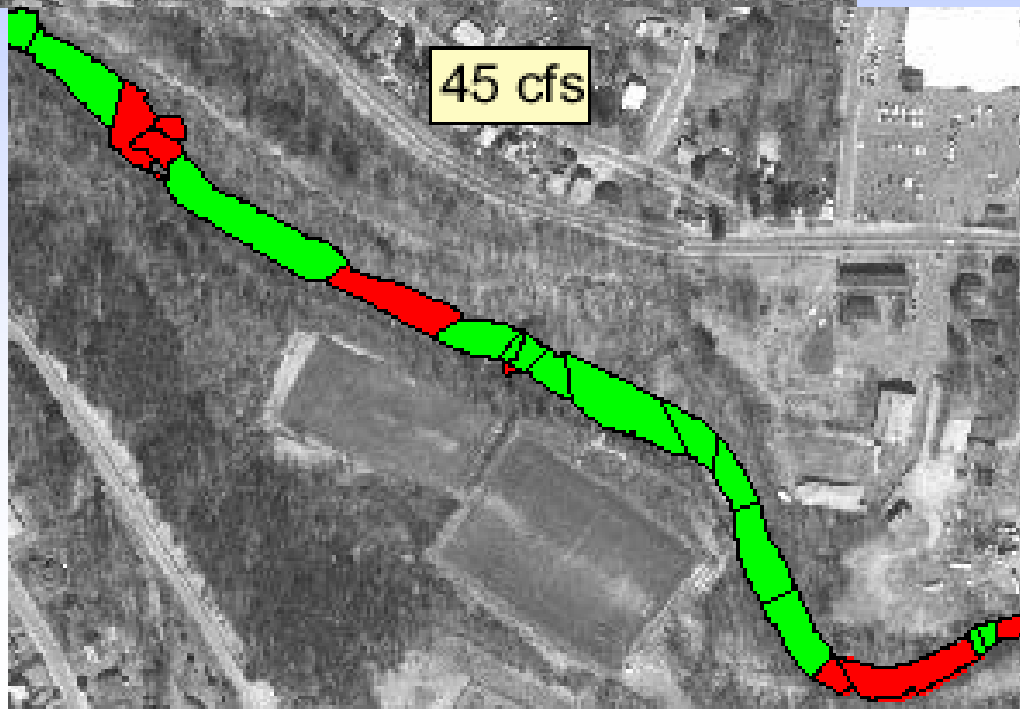
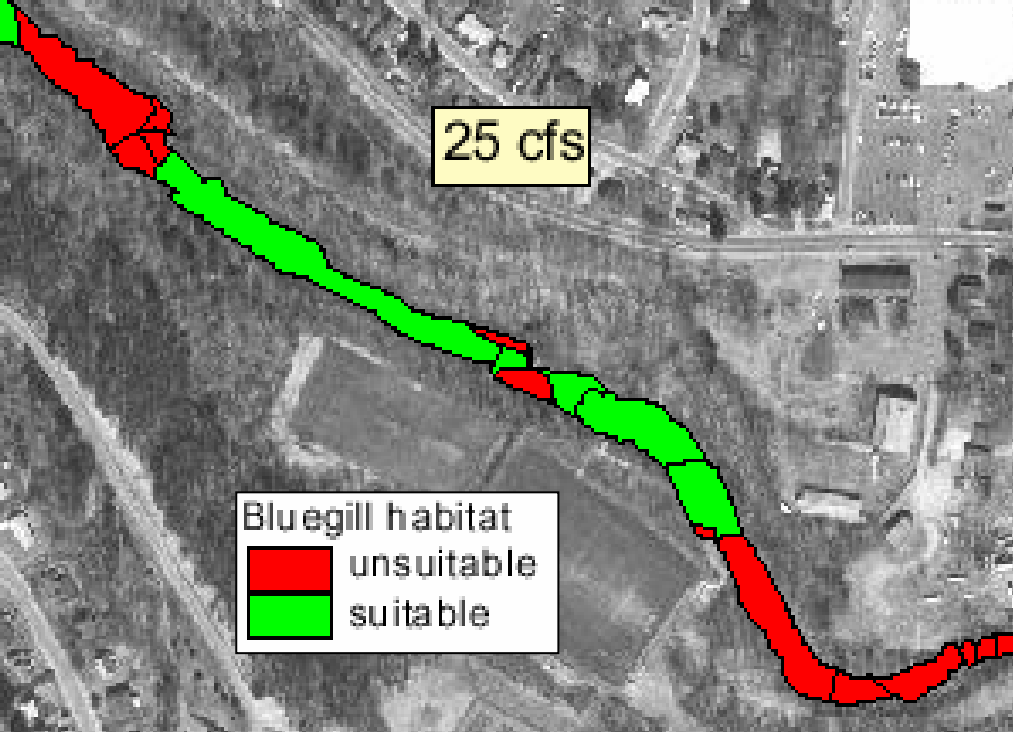


7-23.shp

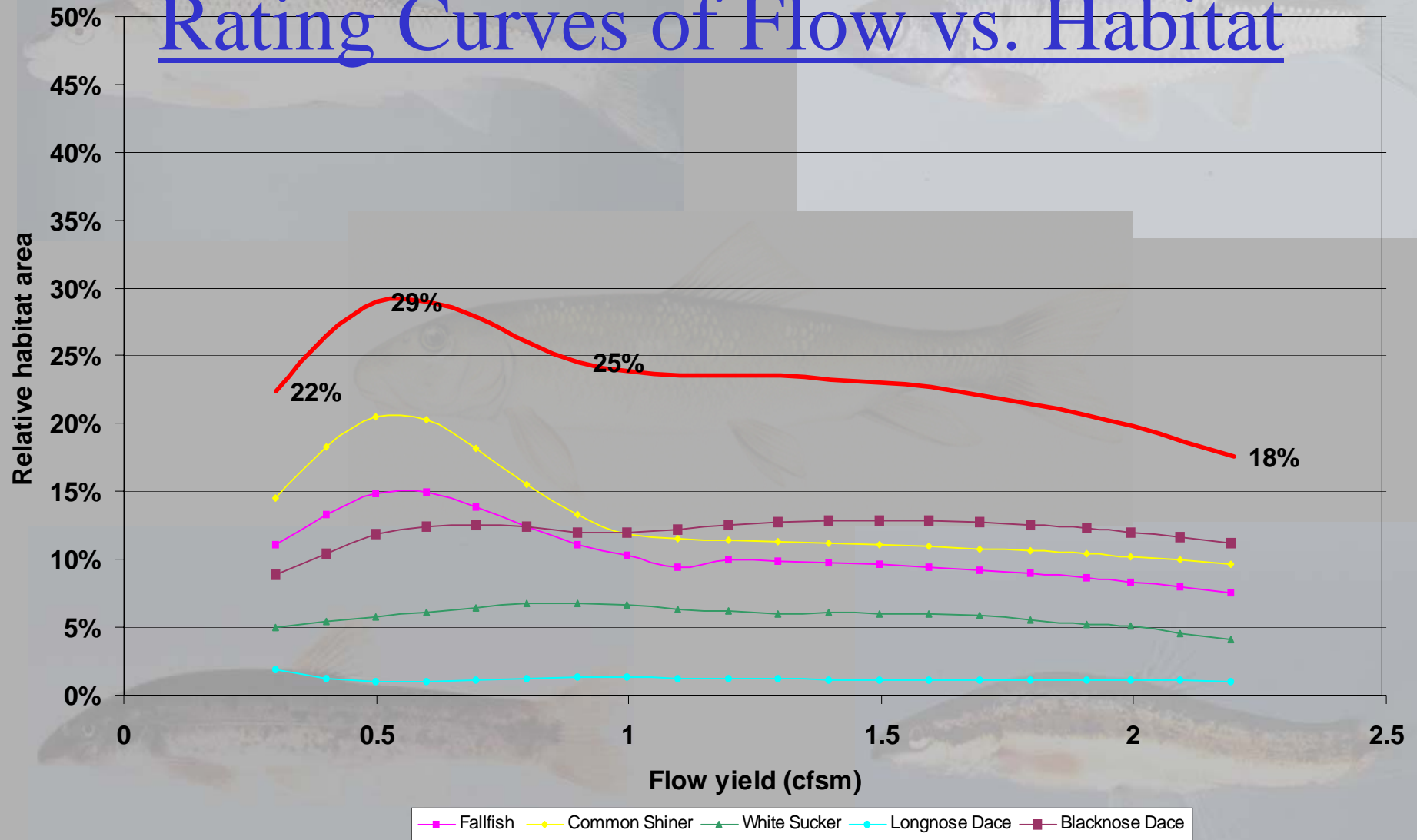
orange	backwater
black	cascade
yellow	fast run
purple	glide
dark blue	pool
light grey	pool plunge
pink	rapid
cyan	riffle
green	run
red	side arm



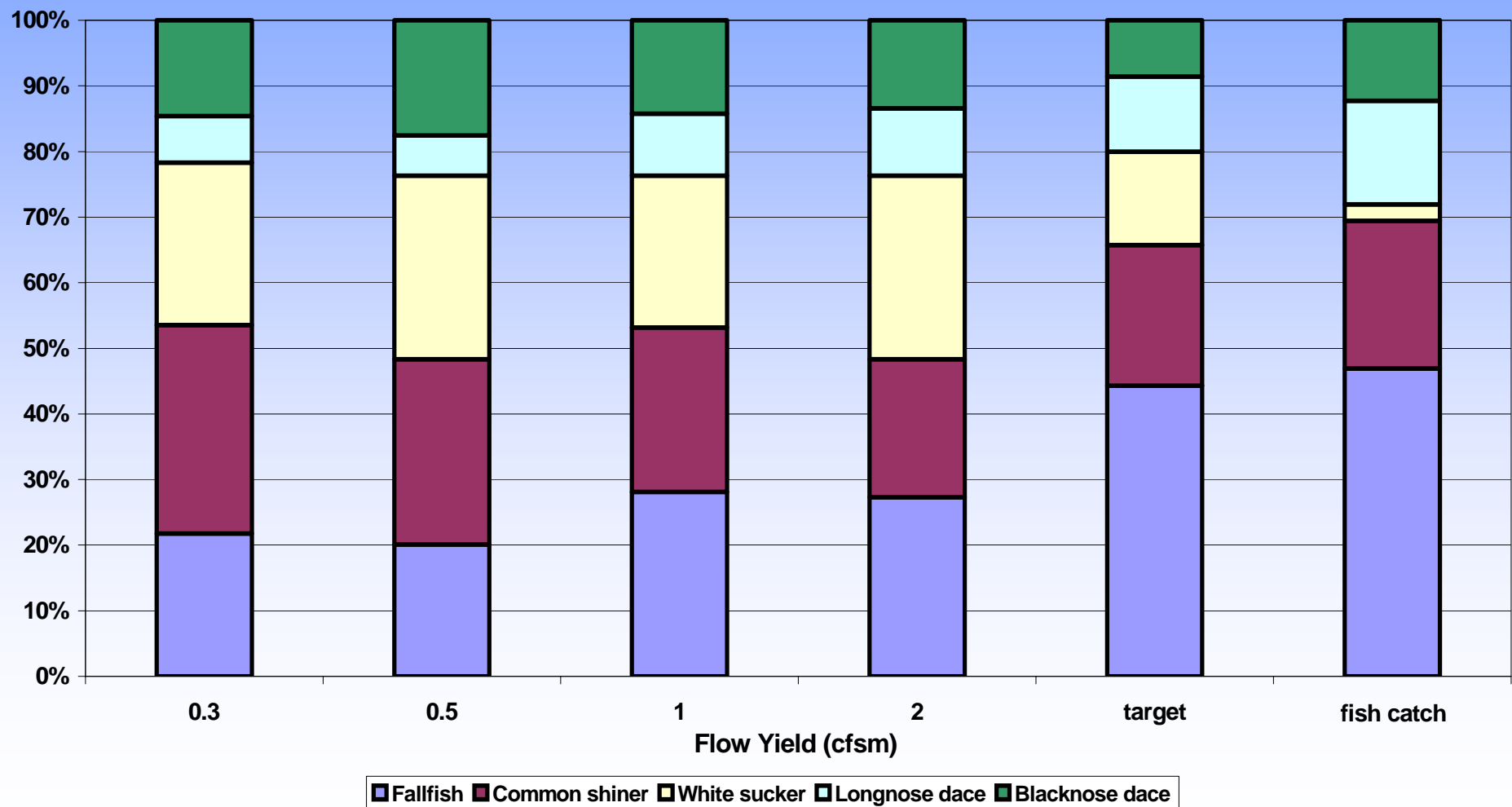
Habitat Mapping at Multiple Flows to Create Rating Curve of Habitat to Flow



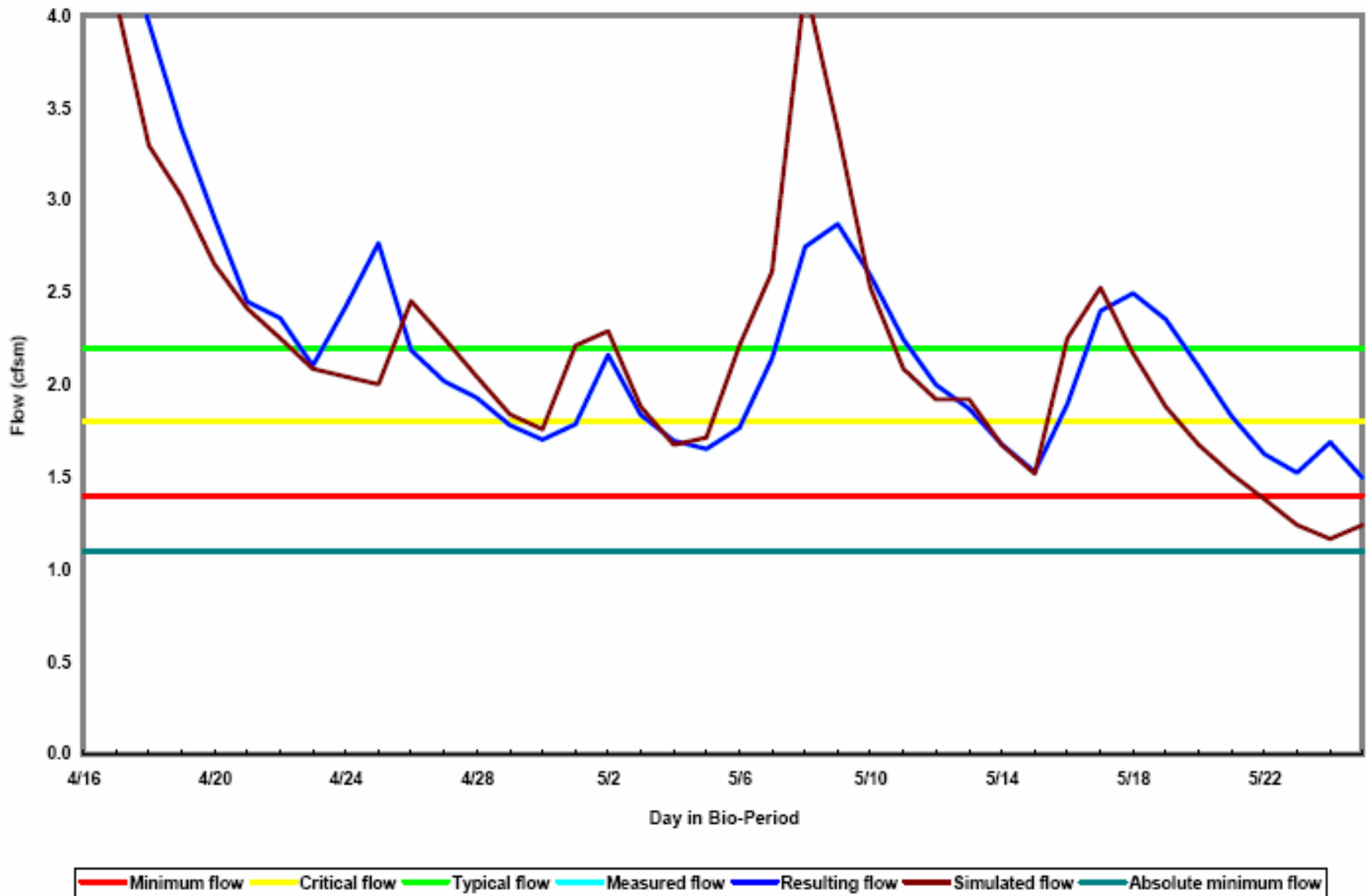
Rating Curves of Flow vs. Habitat



Habitat change for fish species with different flows (Quinebaug)



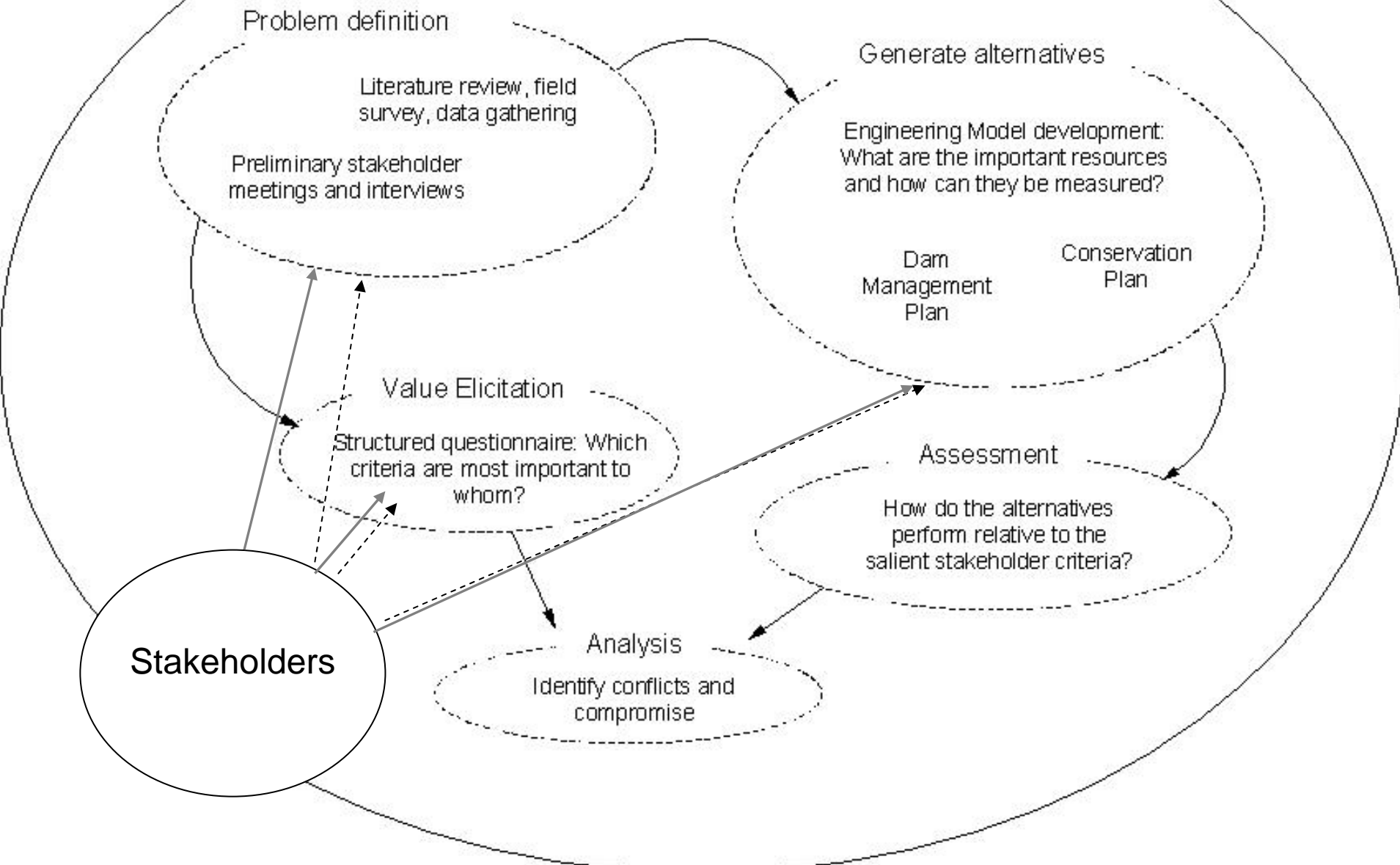
Protected flows within a bioperiod



Multi-Criteria Decision Analysis

- List management activities for the WMP
- Ask water users and dam owners preferences
- Compare and balance management needs with preferences
- Repeat interviews with new arrangement
- Revise management plan alternatives
- Repeat as necessary

Multi-Criteria Decision Analysis



Souhegan Timeline - Projection

March 06	Task 5 – PISF Assessments and Proposed PISF Report
April 06	Task 6 – PISF Public Hearing (joint)
April 06	Task 7 – PISF Report for the Souhegan River
April 06	Task 8 – Assessment of Water Use with the Established PISF
May 06	Task 9 – Development of WMP Sub-Plans
June 06	Task 10 – Proposed WMP
June 06	Task 11 – WMP Public Hearing (joint)
July 06	Task 12 –WMP Report for the Souhegan
	DES adopts Water Management Plan for Souhegan

Lamprey Timeline

March 06	Task 2 – Groundwater
November 05	Task 4 – Assessment Methods Report
November 06	Task 5 – PISF Assessments and Proposed PISF Report
December 06	Task 6 – PISF Public Hearing (joint)
February 07	Task 7 – PISF Report for the Souhegan River
March 07	Task 8 – Assessment of Water Use with the Established PISF
April 07	Task 9 – Development of WMP Sub-Plans
May 07	Task 10 – Proposed WMP
June 07	Task 11 – WMP Public Hearing (joint)
August 07	Task 12 – WMP Report for the Souhegan
	DES adopts Water Management Plan for Lamprey

INSTREAM FLOW PROTECTION PILOT PROGRAMS TIMELINE SEPTEMBER 2005

Souhegan River ISF Pilot Program

April 2006	DES establishes Protected Flows
July 2006	DES adopts Water Management Plan (Last year - March 06)

Lamprey River ISF Pilot Program

February 2007	DES establishes Protected Flows
August 2007	DES adopts Water Management Plan (Last year - August 06)

Legislative Deadlines for Completion of ISF Pilot Program

By April 1, 07	DES report to legislature (PISF and WMP reports)
By June 1, 07	DES/legislative committees hold public hearing(s) jointly
By Oct 1, 07	Lamprey and Souhegan PISFs and WMPs adopted
By Oct 1, 08 or one year following WMPs adoption	DES public hearing and 30-day comment period
By Dec 1, 08	DES final report to legislature
By Dec 1, 08	SB 330 report to governor and legislature

Related topics

- Conservation rules – May 2005
- Water Use Registration and Reporting legislation and rules
- Annual (2003) Water Use versus Stream Flow Report completed

Water Use versus Stream Flow Assessment

- Generalized assessment (monthly)
- Uses General Standard until PISF values are defined
- Indicates rivers and river segments most heavily used

Water Use Available Through Registration and Reporting Program

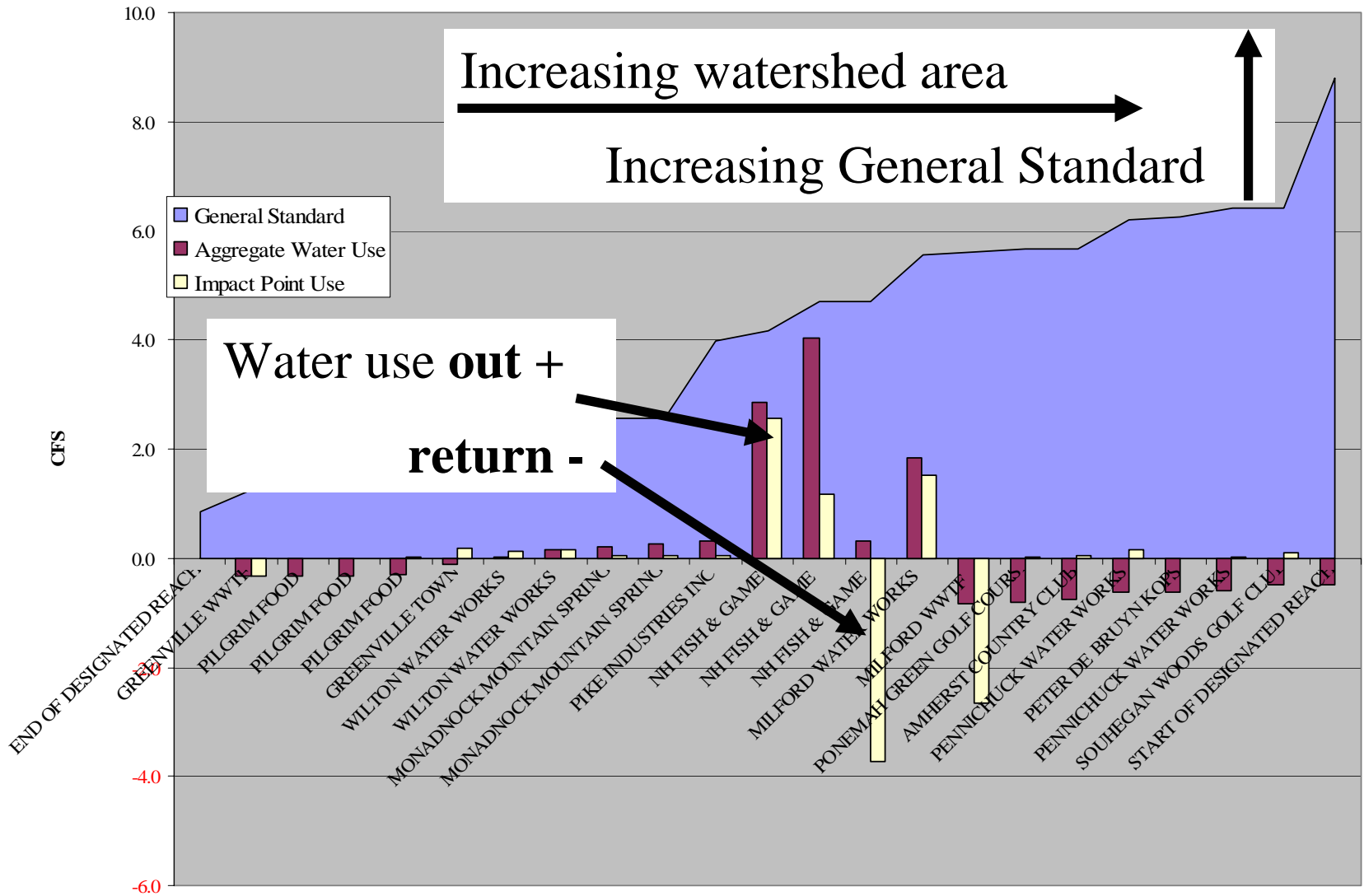
2003 Souhegan Water Use in CFS

SD_ID	DA on DR (SQ MILE)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
END OF DES. RIVER	21.1												
20228-S01	22.7	21.73	24.06	21.73	22.46	21.73	22.46	21.73	21.73	22.46	21.7	22.5	21.7
20228-D01	22.7	-21.73	-24.06	-21.73	-22.46	-21.73	-22.46	-21.73	-21.73	-22.46	-21.7	-22.5	-21.7
20229-S01	29.5	24.96	27.63	24.96	25.79	24.96	25.79	24.96	24.96	25.79	25.0	25.8	25.0
20229-D01	29.5	-24.96	-27.63	-24.96	-25.79	-24.96	-25.79	-24.96	-24.96	-25.79	-25.0	-25.8	-25.0
20230-S01	29.6	31.07	34.40	31.07	32.11	31.07	32.11	31.07	31.07	32.11	31.1	32.1	31.1
20230-D01	29.6	-31.07	-34.40	-31.07	-32.11	-31.07	-32.11	-31.07	-31.07	-32.11	-31.1	-32.1	-31.1
20086-D01	31.0	-0.21	-0.33	-0.38	-0.40	-0.33	-0.33	-0.22	-0.23	-0.21	-0.2	-0.3	-0.3
20681-S04	31.5	0	0	0	0	0	0	0	0	0	0	0	0
20681-S03	31.6	0	0	0	0	0	0	0	0	0	0	0	0
20681-S02	31.6	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.02	0.03	0.02
20065-S03	38.8	0.17	0.17	0.18	0.18	0.18	0.21	0.21	0.20	0.19	0.22	0.17	0.16
20065-S02	46.8	0.13	0.12	0.13	0.13	0.13	0.17	0.15	0.16	0.13	0.12	0.12	0.13
20065-S01	46.8	0.13	0.13	0.13	0.11	0.15	0.15	0.23	0.15	0.14	0.13	0.12	0.16
20621-S02	63.7	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
20621-S01	64.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
20281-S01	99.5	0.00	0.00	0.00	0.04	0.05	0.06	0.13	0.09	0.11	0.04	0.04	0.00
20218-S01	104.2	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
20218-S02	117.4	1.23	1.23	1.23	1.17	1.17	0.62	1.23	1.23	1.23	1.11	1.11	1.11
20218-D01	117.4	-3.79	-3.79	-3.79	-3.73	-3.73	-3.19	-3.79	-3.79	-3.79	-3.68	-3.68	-3.68
20100-S01	139.0	1.47	1.45	1.39	1.45	1.53	1.60	1.59	1.66	1.56	1.38	1.33	1.34
20092-D01	140.0	-2.00	-1.96	-3.22	-3.21	-2.66	-2.36	-1.62	-1.72	-1.58	-1.69	-1.96	-1.95
20624-S01	141.7	0.00	0.00	0.00	0.00	0.01	0.03	0.09	0.05	0.02	0.00	0.00	0.00
20190-S01	141.7	0.00	0.00	0.00	0.00	0.05	0.16	0.47	0.29	0.10	0.03	0.00	0.00
20000-S01	155.2	0.05	0.03	0.05	0.13	0.15	0.20	0.22	0.11	0.10	0.07	0.05	0.06
20383-S01	156.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20659-S01	160.6	0.03	0.03	0.03	0.04	0.03	0.08	0.12	0.10	0.09	0.02	0.01	0.01
20523-S01	160.6	0.00	0.00	0.00	0.00	0.09	0.09	0.35	0.20	0.12	0.03	0.00	0.00
START OF DES. RIVER	219.7												

AWUs

Location

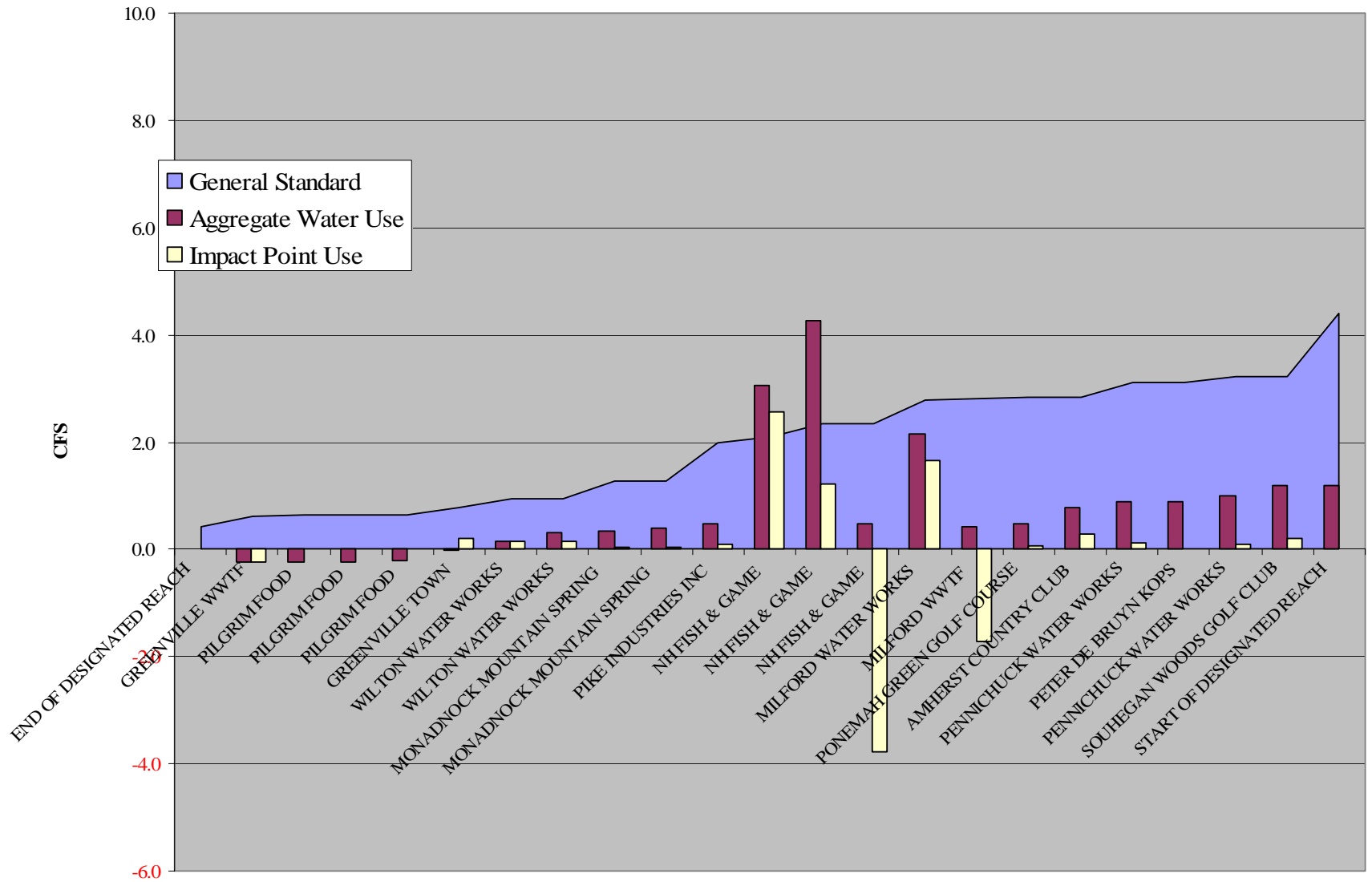
May 2003 Souhegan



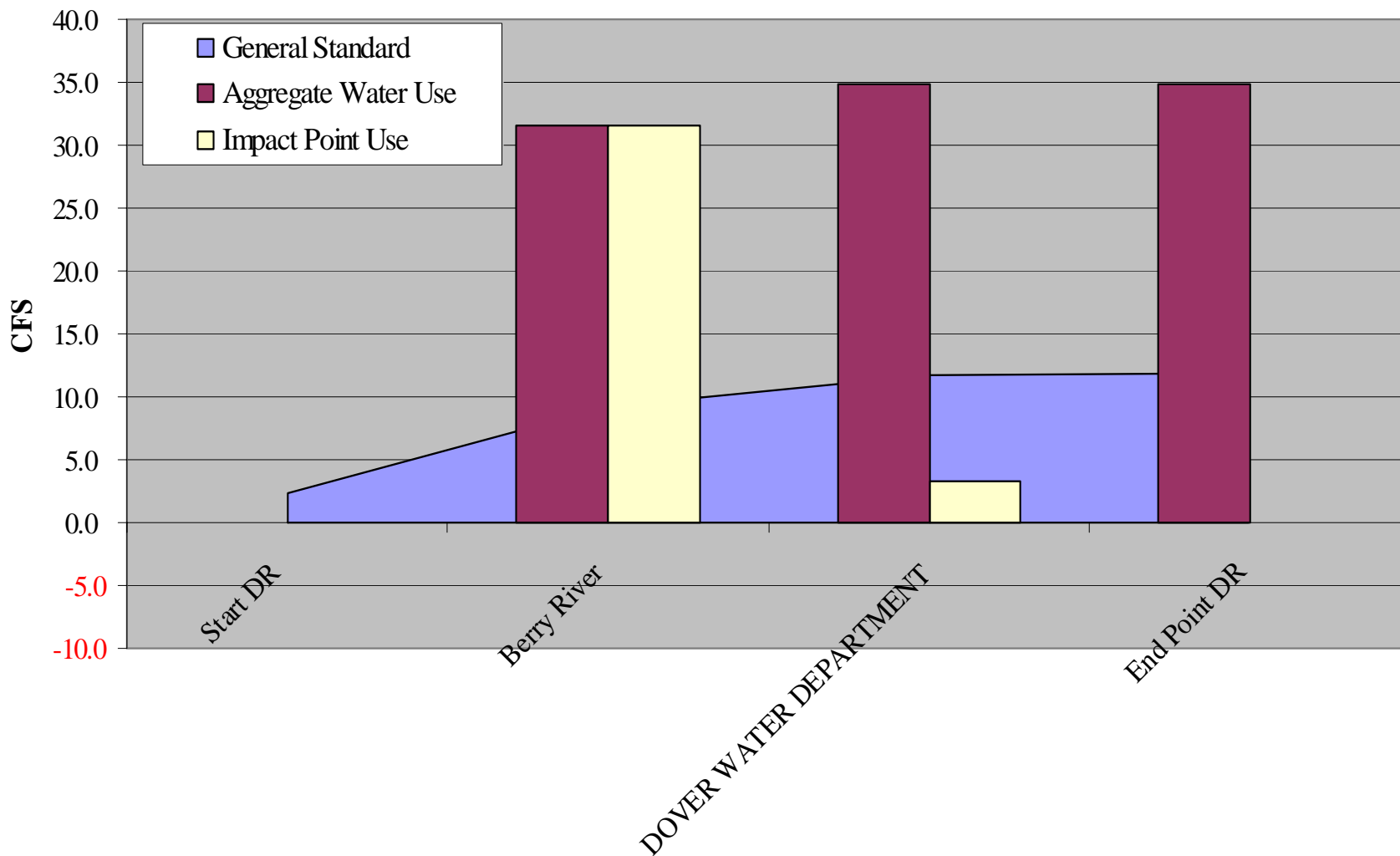
Rivers not exceeding the General Standard in 2003 in a monthly assessment of water use

- Cold
- Connecticut
- Merrimack (Upper)
- Pemigewasset
- Piscataquog (Middle Branch)
- Swift

August 2003 Souhegan



March 2003 Isinglass



Results of 2003 Water Use versus Stream Flow Assessment

Designated River Name	Months Not In Compliance with the General Standard
Isinglass	All 12 months
Contoocook (main stem)	February, July, August, September and November
Exeter	July, August, September
Lamprey	July, August, September
Souhegan	July, August, September
Ashuelot	July
Contoocook (North Branch)	July
Merrimack (Lower)	July
Piscataquog (Lower Branch and main stem)	July
Piscataquog (Upper Branch)	July
Saco	January

References

- <http://www.des.state.nh.us/rivers/instream/>
- <http://www.unh.edu/erg/souhegan/>
- RSA 483 – Rivers Management and Protection Act
- SB330 – Laws of 2000, Chapter 242
- HB1449 – Laws of 2002, Chapter 278
- HB4 – Laws of 2003, Chapter 319;48-51
- Env-Ws 1900 – “Instream Flow Rules”



wives@des.state.nh.us

<http://www.des.state.nh.us/rivers/instream/>